AGENDA ITEM IV C

PROPOSED LETTER OF INTENT

NORTHWESTERN STATE UNIVERSITY

M.S. IN APPLIED SCIENCE AND TECHNOLOGY

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BACKGROUND INFORMATION

Letters of Intent

Prior to the submittal of a proposal for a new academic program, a college/university must submit a Letter of Intent for assessment and approval. Letters of Intent serve two related purposes: 1) they allow the Board of Regents to decide whether campuses should continue to plan for the development of new academic programs; and 2) they serve to coordinate statewide the development of new academic programs. Letters of Intent **do not** serve as the mechanism to determine need, review curricula, assess resources, or approve a budget. These processes are accomplished during the full program proposal review.

Colleges and universities shall transmit Letters of Intent to the Commissioner of Higher Education for all new programs to be proposed, with the exception of proposed undergraduate programs below the baccalaureate level.

Procedures and timelines for Letters of Intent are as follows:

1. **A Letter of Intent may be filed at any time.**
2. **A separate document must be prepared for each projected program.**
3. **Letters of Intent will be scheduled for consideration by the Board of Regents within ninety days (90) after receipt of documentation.**
4. **A full program proposal may be submitted ninety (90) days after a Letter of Intent has been approved by the Board of Regents.**
5. **Letters of Intent are valid for three years after approval by the Board of Regents. Upon expiration of this time period, a new Letter of Intent must be submitted.**

The following factors will be considered in assessing Letters of Intent:

1. **The program must be within the role and scope of the institution.**
2. **The program must not be needlessly duplicative of those at other institutions of higher education.**
3. **The program shall be consistent with the mandates of the desegregation Settlement Agreement.**

4. **The program shall adhere to specific criteria for funding. More specifically, the Board of Regents shall not approve planning for a new academic program unless the prospective program meets certain funding criteria. (See "Staff Analysis" section below)**

Program Description

The Letter of Intent provides the following background information:

> *Throughout most of the 20th century, the United States has been the undisputed world leader in scientific and technological innovation. This dominant position was primarily the product of a superior higher education system in STEM fields during the first two thirds of the century. Regrettably, it is increasingly evident that in more recent decades the United States has been producing an alarmingly fewer number of STEM graduates than other countries. Coupled with an increasingly higher demand for a technically skilled workforce both in the private and public sectors, there is little disagreement between federal and state policy makers, educators, economists, and employers that higher education institutions need to reinforce and expand their STEM "pipelines" (e.g., see Education Research Brief published by the Massachusetts Department of Education Office of Strategic Planning, Research and Evaluation, October, 2007).*

The University notes that a variety of new curricular options are being pursued across the nation to respond to this pressing need, including the development of an "Applied Science" master's degree. Rather than preparation for doctoral study, these "practitioner" programs educate students for immediate industry employment and research support.

More specifically:

> *The College of Science and Technology at Northwestern State University proposes a Master of Science in Applied Science and Technology (MS-AS&T) program with focus on two initial concentrations: 1) Laboratory Informatics and 2) Environmental Sciences. Specifically, we propose,*
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> 1. *A two-year postgraduate program requiring student to take 36 semester hours of graduate level courses including a 6-month internship with a partnering potential employer. The internship may be divided into two 3-month periods taken at the end of each year of enrollment in the program.*
> 2. *To increase recruitment into the MS-AS&T program, students who have completed three years of undergraduate studies will be allowed to join the MS-AS&T program as long as they have completed appropriate prerequisites. Courses taken during the MS-AS&T may be applied towards fulfillment of both a B.S. degree as well as a MS-AS&T resulting in a "3+2" degree plan.*
> 3. *24 semester hours are to be dedicated to concentration-specific courses.*
> 4. *12 semester hours will be dedicated to a six-month internship.*

With regard to the choice of Laboratory Informatics and Environmental Science options, the University observes:

> *The fastest growing sector of the U.S. economy in the last decade has been health care, and it is expected to expand further in the coming decade(s). This growth has been spurred to a large extent by an explosion in health related "informatics", not the least of which is the deciphering of the entire human genome. In their Labor Market and Economic Analysis of 2007, the Employment Development Department, Labor Market Information Division stated: "Top growth occupations include bioinformatics specialists, an emerging occupation encompassing the skills of computer software engineers and database administrators". The for-profit pharmaceutical and biotechnology industries as well the non-profit and governmental biomedical research sectors have all invested heavily in the area of informatics, and as a result have created a huge demand for a highly-skilled workforce, specifically scientists with a master's degree (Ph.D. scientists are not needed in large numbers and those with a bachelor's degree do not have sufficient skills to readily assume jobs and would require extensive training). Although the need for a large number of informaticians was initially filled by recruiting people with distinct backgrounds in biology, mathematics, chemistry, physics, computer science, toxicology and many other natural sciences, it quickly became apparent that developing a workforce of cross-trained individuals is more cost-effective and conducive to a faster pace of scientific discovery. Of equal importance is the fact that such a workforce will be expected primarily to execute scientific projects as opposed to designing them (the latter is still the function of Ph.D. scientists). As such, a master degree program that emphasizes hands-on experience and multidisciplinary cross-training would be extremely valuable to the state and national economy.*
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> *Another field of particular interest to Louisiana is Environmental Sciences. Several of the most significant economic sectors in the state, including the petrochemical, aquaculture, and agriculture industries have a highly interdependent relationship with the environment. At both the federal and state levels, the importance of developing sound and sustainable long-term environmental policies has been highlighted for over three decades. Implementation of these policies as well as monitoring the impact of population growth and development of new industries on the health of the environment in order to refine and improve current policies requires a workforce with diverse skills.*

STAFF ANALYSIS

The Board of Regents follows established criteria in evaluating Letters of Intent, as described in the "Background" section of this agenda item. The following four issues are primary considerations:

1. The program must be within the role and scope of the institution.

According to *Role, Scope, and Mission Statements* of the Master Plan for Public Postsecondary Education: 2001, the projected program is consistent with the stated role, scope, and mission of

the University. The staff notes, however, that Northwestern's past history of master-level degree offerings in the sciences/technology has been troublesome. Since 1986, M.S. programs in Biology, Botany, Zoology, Microbiology, Chemistry, Geology, Physics, Mathematics, Natural Science, Industrial Technology, and Electrical Engineering Technology have been terminated by the Regents for low-numbers of completers. As compared to those previous programs, the projected curricular design, format and purpose are quite different, likely to appeal to a different type of student. Further, the specific areas of interest that will be pursued (Laboratory Informatics and Environmental Sciences) are new subjects for the University. Nevertheless, past history cannot be ignored and it will be incumbent on the University to make a strong, supportable case for why this particular program will attract, retain, and graduate students when prior related programs did not.

2. The program must not be needlessly duplicative of those at other institutions of higher education.

The staff notes that only one other University—Southeastern Louisiana University—currently offers a program similar in design and purpose to that being projected by Northwestern. The program at Southeastern, however, is titled an M.S. in Integrated Science and Technology and has concentrations in Chemistry, Computer Science, Industrial Technology, Mathematics, and Physics.

With regard to graduate study in Environmental Science, only LSU A&M currently offers an M.S. degree in the specific discipline. LSU A&M has also submitted and had approved a Letter of Intent for a new Ph.D. program in Environmental Sciences. Both McNeese and SU-BR offer related Chemistry master's degrees with an Environmental Science focus. LSU-S has submitted a Letter of Intent for a related M.S. program in Environmental Biology, but a proposal has yet to be received or reviewed. So, as it currently stands, Northwestern's program might be duplicative of the program at LSU A&M. The staff opines, however, that given the considerable distance between the two institutions and the likelihood that the two programs would attract significantly different types of students, unnecessary program duplication is probably not a relevant matter. Nevertheless, it will be incumbent upon Northwestern to prove that this indeed is the case in its full proposal.

With regard to graduate study in Laboratory Informatics, no such degree currently exists in Louisiana. The Board of Regents has approved a letter of Intent for a Joint Ph.D. program in Bioinformatics and Computational Biology, but a proposal has not been received nor reviewed. This projected program is also at the doctoral level; no mention has been made of an accompanying master-level degree. Even if such a program was being considered, it is likely to be much more highly research focused than the program envisioned by this Letter of Intent. It would be wise, however, that if these proposals becomes reality, both groups should work together as much as possible to dovetail and articulate program/course offerings to the greater benefit of all affected students.

3. The program shall be consistent with the mandates of the Desegregation Settlement Agreement.

As the 1994 Desegregation Settlement Agreement makes no mention of any master-level degree in Laboratory Informatics and/or Environmental Sciences. SUBR was provided an Environmental Toxicology program, but this is a very specific subarea of Environmental Sciences and at the doctoral-level.

4. The program shall adhere to specific criteria for funding.

Recalling acceptable financial criteria as stated in the Letter of Intent policy:

> **The Board of Regents shall not approve planning for a new academic program unless the prospective program meets one or more of criteria 1-5 below:**
>
> 1. **The program will be formulated through a reorganization of existing courses, requiring no additional State expenditures for at least five years (for example, new options or concentrations in existing programs).**
> 2. **The program will be funded by concomitant reductions in expenditures, requiring no additional State expenditures for at least five years (for example, programs funded by the reallocation of resources from terminated or consolidated programs).**
> 3. **The program will be funded entirely through non-State monies for a period of five years.**
> 4. **The program will demonstrably promote economic development in the State.**
> 5. **The program is deemed indispensable to fulfilling the role, scope, and mission of the university or college and is deemed indispensable to fulfilling critical educational needs of the State.**

Northwestern notes in its proposal:

> *For the program to be successful, the University proposes to add up to four new faculty members with expertise in bioinformatics, environmental sciences, molecular biology, and modeling complex systems. These faculty members would each have a primary appointment in Biological Sciences, Mathematics or the Chemistry and Physics Departments....It is estimated that salaries for these four new positions will be $200,000 per year. The first informatician position has been filled this fiscal year out of existing budget allocations (as replacement of a faculty member who left NSU). The remaining three faculty positions will also be supported by the University within existing budgets.*

Further, Northwestern observes:

> *For the first five years, the University anticipates that the entire cost of the program will be absorbed out of current resources, and no new state appropriations will be needed.*

Accordingly, it appears that Northwestern is claiming that financial criteria #2, 4, and 5 apply wholly or in part to this Letter of Intent.

STAFF SUMMARY

The staff observes that this Letter of Intent represents a significant new venture for Northwestern State University, investigating the possibilities for a technology-based, industry-focused master's program in the sciences. Such a venture holds much promise, but is also filled with possible problematic areas.

1. The University does not currently offer a master-level program in the "hard" sciences; all previous such programs were terminated by the Regents because of low student productivity. So, a new, data-supported case will have to be made by the University that its can attract, support, retain, and graduate an appropriate number of students. This will not be easy because those select students who are likely to be interested will also be courted by other programs at much larger and more renown institutions of higher education.

2. The program design is based on the "applications" process of learning and will require much external industrial support. Care must be taken to ensure that the program does not become overly dependent upon traditional "lecture/laboratory" modalities. The University will have to evidence its abilities in this regard.

3. While the University concedes that additional faculty positions will be needed, without other supporting master-level programs, the staff is not convinced that existing equipment, facilities, learning and research support are sufficient to undergird of a program of this sort. It is also not clear which existing faculty positions will be transferred to this program to fill anticipated program vacancies. No mention was made of needed graduate student support.

So while the proposed program appears to be within the role, scope, and mission of the University and there are no obvious desegregation issues involved, the University will have to address program distinctions that clearly set apart this program from other existing graduate program opportunities in Louisiana and provide a well-supported budget addressing all program needs. The best judge as to whether the University will have successfully addressed these matters and has developed a proposed program of high quality and proven need will be the results of the review of the completed program proposal by a team of out-of-state experts.

Given these circumstances, the staff tenders the following recommendation:

STAFF RECOMMENDATION

The staff recommends that the Academic and Student Affairs Committee grant conditional approval for the proposed Letter of Intent for the projected M.S. program in Applied Science and Technology (CIP Code 30.0101) at Northwestern State University. Any forthcoming proposal as a result of this Letter of Intent shall address program delivery, duplication and funding concerns as expressed in the staff summary.